TOPOLOGICAL PROBLEMS FOR INTEGRAL EQUATIONS AND APPLICATION TO COMPUTING

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This problem for uniform spaces was stated in [1]. It was partially solved in [2]. We improve this result using the method [3]. The result can be used for computation [4].

Definition 1. [3]. *If $Ax \equiv f$ then x is said to be a solution of the equation $Ax = f$ where $A \in C(X \to F)$.*

We propose

Definition 2. *If $Ax \sim \bigcup_{k\in G} f_k$ then x is said to be a generalized solution of the equation*

$$Ax = f.$$

Consider the problem

$$A_{p-q}^{p+q}x = B_{p+q} + \sum_{k=1}^{\infty} k^{-2}. \tag{1}$$

The following partial singular integro-differential equation

$$u''_{tt}(t,x) + u'_x(t,x) = \int_0^{\infty} K^2(t,s,\sqrt{u(t,s)})s^{-(2+\alpha)}ds \quad (0 \le t \le T, x \in R_+) \tag{2}$$

is also considered with the limit boundary condition

$$\lim\{u(t,x)|x \to \infty\} = 1.$$

Theorem 1. *If $A \in L_{2,0}$ then the problem has a solution.*

Proof 1. *Uses the method of transformations [3, Chapter 2].*

Theorem 2. *If $A \in L_{2,2}$ then the problem has a generalized solution.*

Proof 2. *Uses the second method of transformations [3, Chapter 3].*

These results can be applied to the category theory.

A computer program to solve the problem if $A = \{a_{ij}|i = 1,...,n; j = 1,...,n\}$ is a matrix and $B = colon\{b_i(t)|i = 1,...,n\}$ is a vector-function was implemented. It gave an approximate solution.

References

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